

CLAIMS

We claim:

1. A bioreactor apparatus and cell culturing system, comprising:

5 a reactor vessel that may be optionally rotated about its axis while allowing the entrance of fresh or recycled fluid and the removal, optionally, of spent medium, medium to be recycled or filtered or unfiltered medium for the collection of samples, said cylindrical reactor vessel consisting of at least a cylindrical wall, two cover plates, two rotary unions, fill ports, a polymeric filter;

10 means for exchanging gases between the culture medium and ambient gases comprising a user-selected length of permeable tubing and a peristaltic pump;

15 a polymeric fresh-medium storage bag and peristaltic pump for batch feeding, perfusion or sample collection;

20 an enclosure and manifold representing an additional level of chemical containment and a series of pinch valves for the periodic collection of samples of suspended cells or cell-free medium;

25 means for controlling the humidity comprising a humidity control system consisting of a polymeric porous matrix and a fan;

30 a computer program with graphical user interface for automatically and/or robotically controlling all functions especially including rotation of the reactor vessel, feeding fresh medium, perfusing the reactor vessel, timed collection samples of fluid from the reactor, selecting between collecting cells or cell-free supernatant;

35 a sealed compartment for sample-collection bags providing a level of chemical containment for safety;

a sealed external housing for all components of the device except power supply and computer; and wherein all polymeric components are made of low-flammability, non-toxic, heat-resistant polymers such as polycarbonate, polysulfone, polypropylene, polytetrafluoroethylene, or silicone.

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2. The bioreactor apparatus and cell culturing system of claim 1 including a rotary multiple sample collector with capability for collecting cells on filters, fixing the cells and collecting the cells.

5 3. The bioreactor apparatus and cell culturing system of claim 2, said rotary sample collector comprising of a rotating inlet into a compartment with a filter, means to remove waste liquid from an input cell suspension, means for collecting cells in chambers in liquid suspension, and means to store fixed cells
10 for later recovery and examination.

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